

**B.7.6 Residues Resulting from Supervised Trials
(Annex IIA 6.3; Annex IIIA 8.3)**

B.7.6.1 Residues in Target Crops

B.7.6.1.1 Almond and Pecan (Nuts, tree, group 14-12)

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Report: Wyatt, D. (2012) Mesotrione: Mesotrione SC (A12738A) – Magnitude of the Residues in or on Almond and Pecan as Representative Crops of Tree Nuts, Group 14, USA, 2011. Final Report. Laboratory Project IDs: TK0003120 and 2K12-ADPEN-901-TK0003120-001. Unpublished study prepared by Syngenta Crop Protection, LLC. 190 p.

Guidelines: EPA OCSPP Harmonized Test Guideline 860.1500 Crop Field Trials (August 1996)
PMRA Regulatory Directive DIR98-02 – Residue Chemistry Guidelines, Section 9 – Crop Field Trials
PMRA Regulatory Directive DIR2010-05 – Revisions to the Residue Chemistry Crop Field Trial Requirements
OECD Guideline 509 Crop Field Trial (September 2009)

GLP Compliance: No deviations from regulatory requirements were reported which would have an impact on the validity of the study.

Acceptability: The study is considered scientifically acceptable. Although sufficient storage stability data are available for several crops including soybean (high oil content crop) which validate the employed storage interval/conditions, the study authors indicated that data are forthcoming demonstrating the stability of mesotrione and MNBA in/on almond nutmeat stored frozen for 12 months (Syngenta Study TK00661099); these data should be submitted/evaluated so as to confirm the conclusion concerning stability. The acceptability of this study for regulatory purposes is addressed in the forthcoming U.S. EPA Residue Chemistry Summary Document, DP#420017.

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Note: This Data Evaluation Record (DER) was originally prepared under contract by Versar, Inc. (6850 Versar Center, Springfield, VA 22151; submitted 6/30/14). The DER has been reviewed by HED and revised to reflect current Office of Pesticide Programs (OPP) policies.

EXECUTIVE SUMMARY

Syngenta Crop Protection, LLC has submitted field trial data for mesotrione in/on tree nuts from 10 field trials conducted in the United States during the 2011 growing season. Five almond trials were conducted in the North American Free Trade Agreement (NAFTA) Growing Zone 10 (CA; 5 trials) and five pecan trials were conducted in Zones 2 (GA, 2 trials), 4 (LA, 1 trial), 6 (TX, 1 trial), and 8 (TX, 1 trial).

Each trial consisted of one untreated plot and one treated plot. Each treated plot received two broadcast applications to the orchard floor of the 4.0 lb ai/gal suspension-concentrate (SC) formulation of mesotrione [Mesotrione SC Herbicide (A12738A)] at 0.181-0.193 lb ai/A/application (0.203-0.216 kg ai/ha/application) for a total seasonal rate of 0.370-0.380 lb ai/A (0.415-0.426 kg ai/ha). Applications were made at retreatment intervals (RTIs) of 26-32 days using ground equipment in either concentrate spray volumes of 22-33 gal/A (206-309 L/ha) or dilute spray volumes of 299-374 gal/A (2797-3498 L/ha). A nonionic surfactant (NIS), crop oil concentrate (COC), or methylated seed oil (MSO) were included in the spray mixtures for all applications. Samples of almond nutmeat/hulls, and pecan nutmeat were harvested at preharvest intervals (PHIs) of 28-31 days. Additional samples of almond nutmeat/hulls and pecan nutmeat were harvested at PHIs of 27, 32, 35, and 39 days; and 27, 33, 36, and 39 days, respectively, from two trials (-05 and -09) to assess residue decline.

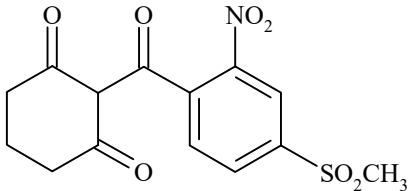
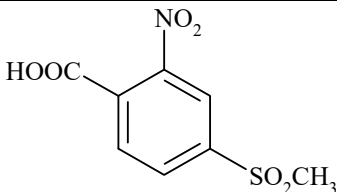
Samples were analyzed for residues of mesotrione and its metabolite 4-(methylsulfonyl)-2-nitrobenzoic acid (MNBA) using a high-performance liquid chromatography method with tandem mass-spectrometric detection (LC/MS/MS), Analytical Method RAM 366/011, developed by Syngenta Crop Protection, Inc., (dated 12/01). The limit of quantitation (LOQ; determined as the lowest level of method validation, LLMV) was 0.01 ppm for each analyte. Acceptable method validation and concurrent recovery data were reported for tree nut samples at fortification levels of 0.01-1.0 and 0.01-0.10 ppm, thus validating the method. The fortification levels were adequate to bracket expected residue levels.

All samples were maintained frozen at the testing facility, during shipping to the laboratory, and at the laboratory prior to analysis. The maximum storage duration for samples between harvest and extraction for analysis was 173 days (5.7 months) for almond nutmeat, 174 days (5.7 months) for almond hulls, and 127 days (4.2 months) for pecan nutmeat prior to analysis. The available freezer storage stability data indicate that residues of mesotrione and its metabolite MNBA were stable when stored frozen for up to 42 months in/on field corn forage, fodder, and grain; 44 months in/on radish root; and 40 months in/on soybean seed (DP# 245477, S. Levy, 6/6/01). In addition, residues of mesotrione were stable in/on blueberry, asparagus, sugarcane, and okra stored frozen at approximately -20 °C for up to 13 months (DP# 338109, S. Levy, 12/05/07). These data are sufficient to validate the employed storage intervals/conditions (note soybean seed, like tree nuts, is a high oil content crop). The study authors indicated that data are forthcoming demonstrating the stability of mesotrione and MNBA in/on almond nutmeat stored frozen for 12 months (Syngenta Study TK00661099); these data should be submitted/evaluated so as to confirm the conclusion made here concerning stability.

Individual sample (and per-trial average) residues of mesotrione were below the LOQ (<0.01 ppm) in/on all samples of almond and pecan nutmeat; while mesotrione residues were <0.01-0.014 (<0.01-<0.012) ppm in/on all samples of almond hulls. Corresponding residues of MNBA were below the LOQ (<0.01 ppm) for all tree nut sample commodities. In the residue decline trials, residues of mesotrione decreased in almond hull as the PHI increased from 27 to 32 days and then remained steady up to the final PHI of 39 days. Residues of mesotrione and MNBA were <LOQ (<0.01 ppm) in almond nutmeat and pecan nutmeat samples; therefore, residue decline could not be assessed.

I. MATERIALS AND METHODS

A. MATERIALS

Table B.7.6.1.1-1. Nomenclature for Mesotrione and Metabolites of Interest.	
Common name	Mesotrione
Identity	2-[4-(methylsulfonyl)-2-nitrobenzoyl]-1,3-cyclohexanedione
CAS no.	104206-82-8
Company experimental name	ZA01296
Other synonyms (if applicable)	NA
	
Metabolite	MNBA
Identity	4-(methylsulfonyl)-2-nitrobenzoic acid
CAS no.	110964-79-9
Company experimental name	NA
Other synonyms (if applicable)	NA
	

B. Study Design

1. Test Procedure

A total of ten residue trials, in/on almond and pecan, were conducted with a 4.0 lb ai/gal SC formulation of mesotrione during the 2011 growing season (Table B.7.6.1.1-2). All trials, except for those listed in the table below, were separated by >20 miles and are therefore considered independent (568_Criteria for Independence of Trials 04/23/2013 (EPA and PMRA)). The trials separated by <20 miles have been determined to be independent as detailed in the table below. Locations and detailed use patterns for the trials are provided in Table B.7.6.1.1-3.

Independent Trial Determination ¹			
Crop	Trial Nos.	Differences	Decision
Almond	-01 and -05	<u>Variety</u> : Carmel vs. Non-Pareil <u>Adjuvant</u> : COC vs. NIS <u>Spray Volume</u> : ~300 vs. ~30 GPA	Independent due to variety, adjuvant, and spray volume [Extra criteria were checked because HED could not tell whether varieties were sufficiently different.]

¹ All assessments are based on the replicate trial guidance presented in draft memo 568_Criteria for Independence of Trials 04/23/2013 (EPA and PMRA).

Table B.7.6.1.1-2. Trial Numbers and Geographical Locations.														
Crop	No. Trials	NAFTA Growing Zone												Total
		1	2	3	4	5	6	7	8	9	10	11	12	
Almond	Sub.	--	--	--	--	--	--	--	--	--	5	--	--	5
	Req. ¹	--	--	--	--	--	--	--	--	--	5	--	--	5
Pecan	Sub.	--	2	--	1	--	1	--	1	--	--	--	--	5
	Req. ¹	--	2	--	1	--	1	--	1	--	--	--	--	5

¹ As per Tables 2 and 5 of 860.1500 for almond and pecan as representative commodities in support of a crop group/subgroup tolerance.

Table B.7.6.1.1-3. Study Use Pattern.							
Location: City, State; Year (Trial ID)	End-use Product/ Formulation ¹	Method of Application/ Timing of Application	Volume gal/A (L/ha)	Rate per Application lb ai/A (kg ai/ha)	RTI (days)	Total Rate lb ai/A (kg ai/ha)	Surfactant/ Adjuvant
Almond							
Terra Bella, CA; 2011 (TK0003120-01)	4.0 lb ai/gal SC	1. Broadcast ground; BBCH 79 (full size)	309 (2890)	0.187 (0.210)	--	0.376 (0.422)	COC
		2. Broadcast ground; BBCH 87 (hull split)	307 (2871)	0.189 (0.212)	32		
Wasco, CA; 2011 (TK0003120-02)	4.0 lb ai/gal SC	1. Broadcast ground; BBCH 79 (fruit at full size)	374 (3498)	0.186 (0.208)	--	0.374 (0.419)	NIS
		2. Broadcast ground; BBCH 87 (hull split)	366 (3423)	0.188 (0.211)	32		
Buttonwillow, CA; 2011 (TK0003120-03)	4.0 lb ai/gal SC	1. Broadcast ground; BBCH 79 (fruit at full size)	29 (271)	0.189 (0.212)	--	0.377 (0.423)	MSO
		2. Broadcast ground; BBCH 87 (hull split)	32 (299)	0.188 (0.211)	31		
Dinuba, CA; 2011 (TK0003120-04)	4.0 lb ai/gal SC	1. Broadcast ground; BBCH 79 (fruit at full size)	27 (253)	0.186 (0.208)	--	0.376 (0.421)	COC
		2. Broadcast ground; BBCH 86 (hull split)	28 (262)	0.190 (0.213)	26		
Strathmore, CA; 2011 (TK0003120-05)	4.0 lb ai/gal SC	1. Broadcast ground; BBCH 79 (nearly all fruits have reached final size)	27 (253)	0.190 (0.213)	--	0.380 (0.426)	NIS
		2. Broadcast ground; BBCH 81 (hull split)	31 (290)	0.190 (0.213)	30		
Pecan							
Girard, GA; 2011 (TK0003120-06)	4.0 lb ai/gal SC	1. Broadcast ground; BBCH 76 (nutmeat ~60% in size and maturity)	22 (206)	0.190 (0.213)	--	0.378 (0.424)	NIS
		2. Broadcast ground; BBCH 80 (beginning of ripening)	22 (206)	0.188 (0.211)	30		
Mystic, GA; 2011 (TK0003120-07)	4.0 lb ai/gal SC	1. Broadcast ground; BBCH 73	33 (309)	0.188 (0.211)	--	0.372 (0.417)	COC
		2. Broadcast ground; BBCH 79	31 (290)	0.184 (0.206)	29		
Alexandria, LA; 2011 (TK0003120-08)	4.0 lb ai/gal SC	1. Broadcast ground; Early dough	27 (253)	0.193 (0.216)	--	0.374 (0.419)	MSO
		2. Broadcast ground; Beginning shuck split	26 (243)	0.181 (0.203)	29		
Pearsall, TX; 2011 (TK0003120-09)	4.0 lb ai/gal SC	1. Broadcast ground; BBCH 79 (all nuts full size, water stage)	353 (3302)	0.187 (0.210)	--	0.372 (0.417)	COC
		2. Broadcast ground; BBCH 87 (hard dough)	350 (3274)	0.185 (0.207)	30		
Anton, TX; 2011 (TK0003120-10)	4.0 lb ai/gal SC	1. Broadcast ground; Green shuck	309 (2890)	0.188 (0.211)	--	0.370 (0.415)	NIS
		2. Broadcast ground; Green shuck	299 (2797)	0.182 (0.204)	30		

¹ 4.0 lb ai/gal SC formulation of mesotrione [Mesotrione SC Herbicide (A12738A)].

Almonds and pecans were grown and maintained according to typical agricultural practices. Irrigation was used as needed at most trials. For trials -09 and -10 higher than normal temperatures along with dry weather conditions were attributed to a reduced crop yield, however sufficient sample quantities were available for residue analysis.

Sample Handling and Preparation

Single control and duplicate treated samples of almond nutmeat/hulls and pecan nutmeat (~2.2 lbs each) were collected at maturity (28-31-day PHIs). Additional samples of almond nutmeat/hulls; and pecan nutmeat were harvested at PHIs of 27, 32, 35, and 39 days; and 27, 33, 36, and 39 days, respectively, from two trials (-05 and -09) to assess residue decline. Samples were placed in frozen storage at the field sites within ~1 hour of collection. All samples were shipped within 1-46 days of collection by freezer truck to the analytical laboratory, ADPEN Laboratories, Inc. (Jacksonville, FL) for residue analysis. At the analytical laboratory, samples were maintained frozen (-2 to -22 °C) prior to homogenization in the presence of dry ice and analysis.

2. Description of Analytical Procedures

Samples were analyzed for residues of mesotrione and its metabolite MNBA using a LC/MS/MS method, Analytical Method RAM 366/011, developed by Syngenta Crop Protection, Inc., (dated 12/01) and entitled “Residue Analytical Method for the Determination of Residues of Mesotrione and 4-(Methylsulfonyl)-2-Nitrobenzoic Acid (MNBA) in Crop Samples.” HED notes that the analytical method converts metabolite residues to parent equivalents; however, all MNBA values were below the LOQ (<0.01 ppm).

Briefly, samples were extracted with acetonitrile/HPLC water (50:50, v:v) and sodium chloride using a Polytron homogenizer. The extracts were centrifuged, decanted, and diluted with methanol/HPLC water (10:90, v:v) prior to LC/MS/MS analysis. The LOQ (determined as the LLMV) was 0.01 ppm for each analyte. The limit of detection (LOD) was not reported, however the petitioner indicated the analytical method estimated LODs were 0.002 and 0.005 ppm for mesotrione and MNBA, respectively.

II. RESULTS AND DISCUSSION

Method performance was evaluated during method validation and by use of concurrent recovery samples. For method validation, six samples each of untreated almond nutmeat/hulls were fortified at 0.01 and 1.0 ppm with mesotrione and MNBA; individual recoveries were 85-98% and 84-99% with a standard deviation of 5.1% and 5.5% for mesotrione; and 73-92% and 70-83% with a standard deviation of 8.6% and 5.2% for MNBA. For concurrent recovery, four samples of almond nutmeat/hulls and two samples of pecan nutmeat were fortified at 0.01 and 0.10 ppm with mesotrione and MNBA. Individual recoveries (and standard deviations), respectively, were 91-97% (2.7%), 89-104% (7.9%), and 104-115% (standard deviation is not calculated for sample sizes <3) for mesotrione; and 82-94% (5.0%), 63-87% (12.4%) and 77-84% (standard deviation is not calculated for sample sizes <3) for MNBA. Recoveries were generally within the acceptable range of 70%-120%; therefore, the method was considered valid for the analysis of residues of mesotrione and MNBA in tree nut matrices. The fortification levels bracketed the measured residues. Concurrent recoveries were corrected for apparent residues in controls.

The detector response was linear (coefficient of determination, $r^2 > 0.9997$) within the range of 0.0001-0.10 ng/ μ L for both analytes. Representative chromatograms of control samples, fortified samples and treated samples were provided. The control chromatograms generally had no peaks of interest above the chromatographic background. The fortified sample chromatograms contained only the analyte of interest, and peaks were symmetrical and well defined. Apparent residues of mesotrione and MNBA in controls were below the LOQ (<0.01 ppm). The reported residue values were not corrected for apparent residues in controls.

Table B.7.6.1.1-4. Summary of Procedural/Concurrent Recoveries of Mesotrione from Tree Nuts.

Matrix	Analyte	Fortification Level (ppm)	Recoveries (%)	Mean \pm Std. Dev. (%)
			Not applicable. See above.	

The field residue samples were stored frozen from harvest to extraction for a maximum of 173 days (5.7 months) for almond nutmeat, 174 days (5.7 months) for almond hulls, and 127 days (4.2 months) for pecan nutmeat (Table B.7.6.1.1-5). The available freezer storage stability data indicate that residues of mesotrione and its metabolite MNBA were stable when stored frozen for up to 42 months in/on field corn forage, fodder, and grain; 44 months in/on radish root; and 40 months in/on soybean seed (DP# 245477, S. Levy, 6/6/01). In addition, residues of mesotrione were stable in/on blueberry, asparagus, sugarcane, and okra stored frozen at approximately -20 °C for up to 13 months (DP# 338109, S. Levy, 12/05/07). These data are sufficient to validate the employed storage intervals/conditions (note soybean seed, like tree nuts, is a high oil content crop). The study authors indicated that data are forthcoming demonstrating the stability of mesotrione and MNBA in/on almond nutmeat stored frozen for 12 months (Syngenta Study TK00661099); these data should be submitted/evaluated so as to confirm the conclusion made here concerning stability.

Table B.7.6.1.1-5. Summary of Storage Conditions.				
Matrix	Analyte	Storage Temperature (°C)	Actual Storage Duration ¹	Interval of Demonstrated Storage Stability
Almond, Nutmeat	Mesotrione	-2 to -22 °C	57-173 days (1.9-5.7 months)	The field residue samples were stored frozen from harvest to extraction for a maximum of 173 days (5.7 months) for almond nutmeat, 174 days (5.7 months) for almond hulls, and 127 days (4.2 months) for pecan nutmeat (Table B.7.6.1.1-5). The available freezer storage stability data indicate that residues of mesotrione and its metabolite MNBA were stable when stored frozen for up to 42 months in/on field corn forage, fodder, and grain; 44 months in/on radish root; and 40 months in/on soybean seed (DP# 245477, S. Levy, 6/6/01). In addition, residues of mesotrione were stable in/on blueberry, asparagus, sugarcane, and okra stored frozen at approximately -20 °C for up to 13 months (DP# 338109, S. Levy, 12/05/07). These data are sufficient to validate the employed storage intervals/conditions (note soybean seed, like tree nuts, is a high oil content crop). The study authors indicated that data are forthcoming demonstrating the stability of mesotrione and MNBA in/on almond nutmeat stored frozen for 12 months (Syngenta Study TK00661099); these data should be submitted/evaluated so as to confirm the conclusion made here concerning stability.
	MNBA			
Almond, Hulls	Mesotrione		58-174 days (1.9-5.7 months)	
	MNBA			
Pecan, Nutmeat	Mesotrione		74-127 days (2.4-4.2 months)	
	MNBA			

¹ Interval from harvest to extraction. Samples were analyzed within 0-4 days of extraction.

² DP# 245477, S. Levy, 6/6/01.

³ DP#338109, S. Levy, 12/05/07.

The results from the submitted field trials are presented in Tables B.7.6.1.1-6 and B.7.6.1.1-7. In tree nuts harvested 28-31 days following two broadcast applications to the orchard floor of the 4.0 lb ai/gal SC formulation of mesotrione at a total seasonal rate of 0.370-0.380 lb ai/A (0.415-0.426 kg ai/ha), individual sample (and per-trial average) of mesotrione were below the LOQ (<0.01 ppm) in/on all samples of almond and pecan nutmeat; while mesotrione residues were <0.01-0.014 (<0.01-<0.012) ppm in/on all samples of almond hulls. Corresponding residues of MNBA were below the LOQ (<0.01 ppm) for all tree nut sample commodities. In the residue decline trials, residues of mesotrione decreased in almond hull as the PHI increased from 27 to 32 days and then remained steady up to the final PHI of 39 days. Residues of mesotrione were <LOQ in almond nutmeat and pecan nutmeat samples and residues of MNBA were below the LOQ (<0.01 ppm) in/on all matrices; therefore, residue decline could not be assessed.

Table B.7.6.1.1-6. Residue Data from Tree Nut Field Trials with Mesotrione.¹							
Location: City, State; Year (Trial ID)	Zone	Crop/Variety	Matrix	Rate lb ai/A (kg ai/ha)	PHI (days)	Residues ² (ppm) [Average]	
						Mesotrione	MNBA
Terra Bella, CA; 2011 (TK0003120-01)	10	Almond/Carmel	Nutmeat	0.376 (0.422)	28	(0.0041), (0.0079) [<0.01]	ND, ND [<0.01]
			Hulls			ND, (0.0080) [<0.01]	ND, ND [<0.01]
Wasco, CA; 2011 (TK0003120-02)	10	Almond/Price	Nutmeat	0.374 (0.419)	28	(0.0054), (0.0041) [<0.01]	ND, ND [<0.01]
			Hulls			ND, ND [<0.01]	ND, ND [<0.01]
Buttonwillow, CA; 2011	10	Almond/Monterey	Nutmeat	0.377 (0.423)	29	(0.0053), (0.0044)	ND, ND

Table B.7.6.1.1-6. Residue Data from Tree Nut Field Trials with Mesotrione. ¹							
Location: City, State; Year (Trial ID)	Zone	Crop/ Variety	Matrix	Rate lb ai/A (kg ai/ha)	PHI (days)	Residues ² (ppm) [Average]	
						Mesotrione	MNBA
(TK0003120-03)						[<0.01]	[<0.01]
			Hulls			ND, ND [<0.01]	ND, ND [<0.01]
Dinuba, CA; 2011 (TK0003120-04)	10	Almond/ Carmel	Nutmeat	0.376 (0.421)	30	ND, ND [<0.01]	ND, ND [<0.01]
			Hulls			(0.0046), (0.0026) [<0.01]	ND, ND [<0.01]
Strathmore, CA; 2011 (TK0003120-05)	10	Almond/ Non-Pareil	Nutmeat	0.380 (0.426)	27	ND, (0.0027) [<0.01]	ND, ND [<0.01]
					30	ND, ND [<0.01]	ND, ND [<0.01]
					32	ND, ND [<0.01]	ND, ND [<0.01]
					35	ND, (0.0029) [<0.01]	ND, ND [<0.01]
					39	ND, ND [<0.01]	ND, ND [<0.01]
			Hulls		27	0.051, 0.058 [0.055]	ND, ND [<0.01]
					30	0.014, ND [<0.012]	ND, ND [<0.01]
					32	0.024, 0.025 [0.025]	ND, ND [<0.01]
					35	0.025, 0.013 [0.019]	ND, ND [<0.01]
					39	0.012, 0.034 [0.023]	ND, ND [<0.01]
Girard, GA; 2011 (TK0003120-06)	2	Pecan/ Desirables	Nutmeat	0.378 (0.424)	29	(0.0046), (0.0025) [<0.01]	ND, ND [<0.01]
Mystic, GA; 2011 (TK0003120-07)	2	Pecan/ Sumner	Nutmeat	0.372 (0.417)	31	(0.0066), (0.0078) [<0.01]	ND, ND [<0.01]
Alexandria, LA; 2011 (TK0003120-08)	4	Pecan/ Creek	Nutmeat	0.374 (0.419)	31	ND, (0.0022) [<0.01]	ND, ND [<0.01]

Table B.7.6.1.1-6. Residue Data from Tree Nut Field Trials with Mesotrione.¹							
Location: City, State; Year (Trial ID)	Zone	Crop/Variety	Matrix	Rate lb ai/A (kg ai/ha)	PHI (days)	Residues ² (ppm) [Average]	
						Mesotrione	MNBA
Pearsall, TX; 2011 (TK0003120-09)	6	Pecan/Cheyenne	Nutmeat	0.372 (0.417)	27	ND, (0.0029) [<0.01]	ND, ND [<0.01]
					29	(0.0029), (0.0025) [<0.01]	ND, ND [<0.01]
					33	ND, (0.0052) [<0.01]	ND, ND [<0.01]
					36	(0.0040), ND [<0.01]	ND, ND [<0.01]
					39	ND, ND [<0.01]	ND, ND [<0.01]
Anton, TX; 2011 (TK0003120-10)	8	Pecan/Western Schley	Nutmeat	0.370 (0.415)	30	(0.0031), (0.0051) [<0.01]	ND, ND [<0.01]

¹ All trials reflected application of the 4.0 lb ai/gal SC formulation.

² ND = not detected (<LOD). The estimated LODs were 0.002 ppm for mesotrione and 0.005 ppm for MNBA, and the LOQ was 0.01 ppm for each analyte. Values between the LOD and LOQ are reported in parenthesis. Per-trial averages were calculated by the study reviewer using the LOQ for all residues reported as <LOQ.

Table B.7.6.1.1-7. Summary of Residues from Tree Nut Field Trials with Mesotrione.										
Crop Matrix	Total Application Rate lb ai/A (kg ai/A)	PHI (days)	n ¹	Residues (ppm)						
				Min. ²	Max. ²	LAFT ³	HAFT ³	Median ³	Mean ³	SD ³
Mesotrione										
Almond, nutmeat	0.374-0.380 (0.419-0.426)	28-30	5	<0.01	<0.01	<0.01	<0.01	0.01	0.01	NA
Almond, hulls	0.374-0.380 (0.419-0.426)	28-30	5	<0.01	0.014	<0.01	<0.012	0.010	0.010	0.001
Pecan, nutmeat	0.370-0.378 (0.415-0.424)	29-31	5	<0.01	<0.01	<0.01	<0.01	0.01	0.01	NA
MNBA										
Almond, nutmeat	0.374-0.380 (0.419-0.426)	28-30	5	<0.01	<0.01	<0.01	<0.01	0.01	0.01	NA
Almond, hulls	0.374-0.380 (0.419-0.426)	28-30	5	<0.01	<0.01	<0.01	<0.01	0.01	0.01	NA
Pecan, nutmeat	0.370-0.378 (0.415-0.424)	29-31	5	<0.01	<0.01	<0.01	<0.01	0.01	0.01	NA

¹ n = number of field trials.

² Values based on total number of samples.

³ Values based on per-trial averages. LAFT = lowest average field trial, HAFT = highest average field trial, SD = standard deviation. For computation of the LAFT, HAFT, median, mean, and standard deviation, values <LOQ are assumed to be at the LOQ (0.01 ppm for mesotrione and MNBA). NA = not applicable.

III. CONCLUSIONS

The almond and pecan field trials are considered scientifically acceptable. The results of the study showed that in tree nuts harvested 28-31 days following two broadcast applications to the orchard floor of the 4.0 lb ai/gal SC formulation of mesotrione at a total seasonal rate of 0.370-0.380 lb ai/A (0.415-0.426 kg ai/ha), individual sample (and per-trial average) of mesotrione were below the LOQ (<0.01 ppm) in/on all samples of almond and pecan nutmeat; while mesotrione residues were <0.01-0.014 (<0.01-<0.012) ppm in/on all samples of almond hulls. Corresponding residues of MNBA were below the LOQ (<0.01 ppm) for all tree nut sample commodities. In the residue decline trials, residues of mesotrione decreased in almond hull as the PHI increased from 27 to 32 days and then remained steady up to the final PHI of 39 days. Residues of mesotrione were <LOQ in almond nutmeat and pecan nutmeat samples and residues of MNBA were below the LOQ (<0.01 ppm) in/on all matrices; therefore, residue decline could not be assessed.

An acceptable method was used for residue quantitation. Adequate storage stability data are also available. However, it is noted that the study authors indicated that data are forthcoming demonstrating the stability of mesotrione and MNBA in/on almond nutmeat stored frozen for 12 months (Syngenta Study TK00661099); these data should be submitted/evaluated so as to confirm the conclusion made here concerning stability.

REFERENCES

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